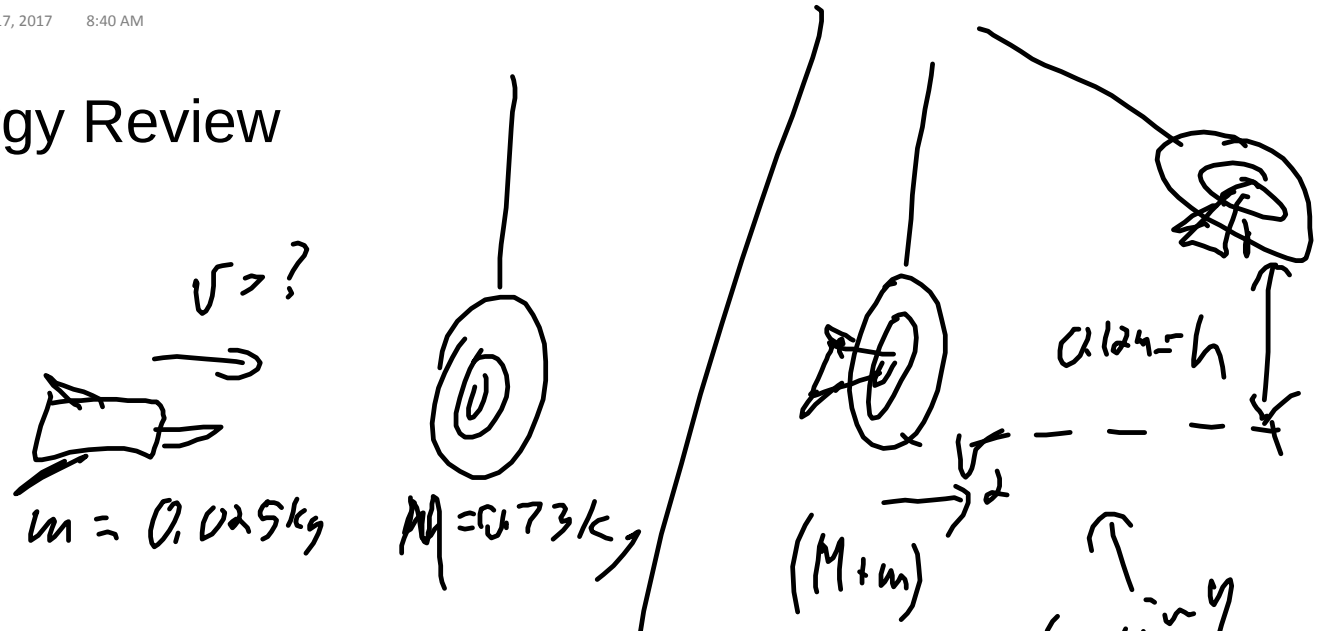
Energy Review

Q16



Collision $\rightarrow \sum P_i = \sum P_f$

$\rightarrow$ inelastic collision

$$mv + 0 = (m+M)v_2$$

Swing $\frac{1}{2}(m+M)v_2^2 = (m+M)gh$

v_2 ↑ after collision

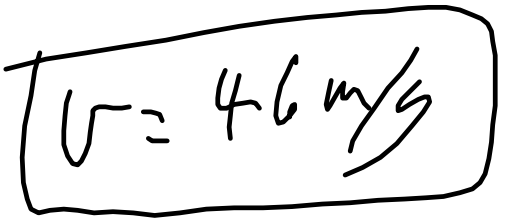
$$v_2 = \sqrt{2gh}$$

$$v_2 = \sqrt{2(9.81)(0.12)}$$

$$= 1.53 \text{ m/s}$$

$$mv = (m+M)v_2$$

$$v = \frac{(0.025+0.73)}{0.025}(1.53)$$



Big ideas for the test Monday:

momentum p=mv in kgm/s vector conserved in collisions and explosions with no external forces

impulse $\Delta p = F_{net}\Delta t$ = area under Fnet-t graph

Work = Fd = area under the F-d graph
assuming F is in the direction of d

W= change in energy
$W_{net} = \Delta E_k$ $E_k = 1/2mv^2$

E_g = mgh when g is uniform

Efficiency = Wout/Win x100%

MA = Fout/Fin no units or X
IMA = sin/sout

p214 -
problems 20, 26, 29, 34
p238-
problems 6, 16, 24, 29

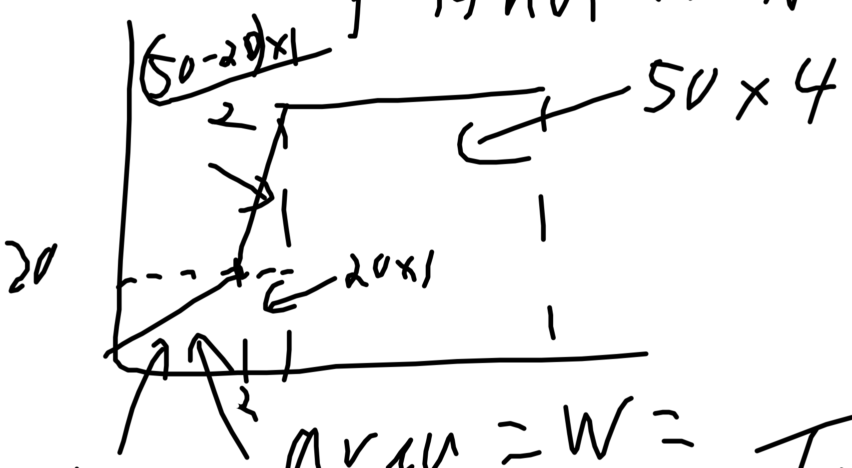
p226 CR 1.4-1.5

assume the second mass is 1/2 the first mass

\# 20

a) W = ~~Fh = 500N × 7.0m = 350J~~

F is not constant



$\frac{1}{2}(20)(2)$

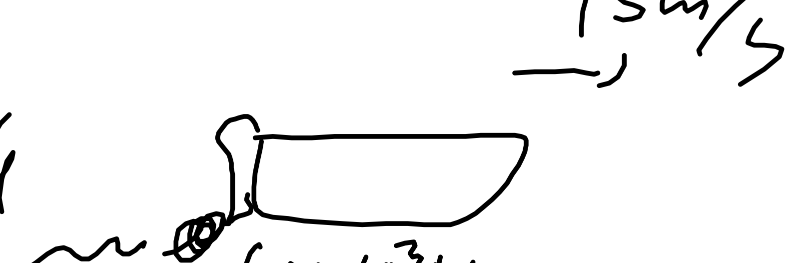
area = W = **255J**

15 (~~30~~) + 20 + 20 + 200 = ~~270J~~

b) $P = \frac{W}{t} = \frac{255}{2} =$ **128W**

1.3×10^2 W

24



P = ? $P = \frac{W}{t} = \frac{Fs}{t} = Fv$

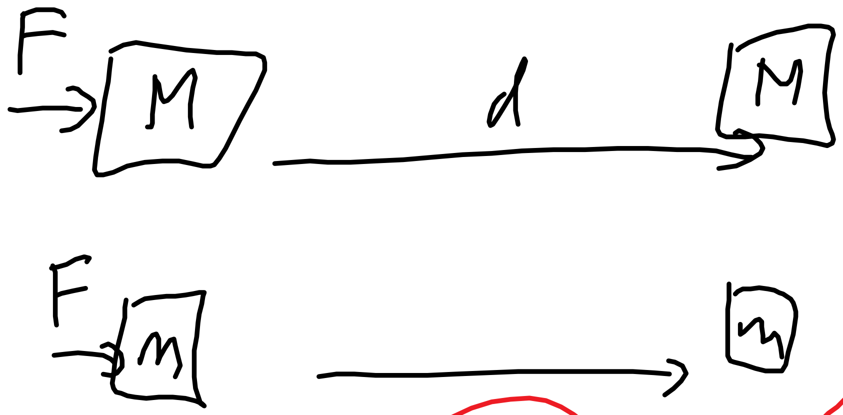
$$P = 6\times10^{3} \times 15\,\text{m/s} = 9.0\times10^{4}\,\text{W}$$

p226
CR 1.4

$W = Fd$

$W = \Delta E_k$

$\frac{1}{2} M v_1^2 = \frac{1}{2} m v_2^2$



$m = \frac{1}{2} M$

$\frac{1}{2} M v_1^2 = \frac{1}{2}\left(\frac{1}{2} M\right) v_2^2$

$v_1^2 = \frac{1}{2} v_2^2$

$2 v_1^2 = v_2^2$

$\sqrt{2}\, v_1 = v_2$

1.5

$F\Delta t = \Delta p$